ATTACHMENT C – Radiation Hazard Analyses for Lindon

Ka band

RADIATION HAZARD CALCULATIONS FOR 10.0 meter EARTH STATION			
Nomenclature	**Formula**	**Value**	**Unit**
INPUT PARAMETERS			
D = Antenna Diameter		10.00	meters
d = Diameter of Feed Mouth		0.029	meters
P = Max Power into Antenna		200	Watts
n = Apperture Effeciency		66%	
k = Wavelength @ 29.1 GHz		0.0103	meters
CALCULATED VALUES			
A = Area of Reflector	PI*D^2/4	78.540	meters^2
l = Length of Near Field	D^2/4k	2425	meters
L = Beginning of Far Field	0.6D^2/k	5820	meters
G = Antenna Gain @ 29.1 GHz	n(PI*D/k)^2	6,129,782	67.9 dBi
a = Area of Feed Mouth	PI*d^2/4	0.0007	meters^2

POWER DENSITY CALCULATIONS

Region	Maximum Power Density in Region		Hazard Assessment (FCC MPE Limit = 5 mW/cm^2)
	Formula	Value (mW/cm^2)	
1 Near Field	4nP/A	0.67	< FCC MPE Limit
2 Far Field	GP/(4(PI)L^2)	0.29	< FCC MPE Limit
3 Transition	<= Nr Fld Region	0.67	< FCC MPE Limit
4 Near Reflector Surface	4P/A	1.02	< FCC MPE Limit
5 Between Reflector & Ground	P/A	0.25	< FCC MPE Limit
6 Between Subreflector and Feed	4P/a	121116.7	> FCC MPE Limit (See Attachment)

Q/V band

RADIATION HAZARD CALCULATIONS FOR 10.0 meter EARTH STATION			
Nomenclature	Formula	Value	Unit
INPUT PARAMETERS			
D = Antenna Diameter		10.00	meters
d = Diameter of Feed Mouth		0.029	meters
P = Max Power into Antenna		200	Watts
n = Apperture Effeciency		55%	
k = Wavelength @ 51.4 GHz		0.0058	meters
CALCULATED VALUES			
A = Area of Reflector	PI*D^2/4	78.540	meters^2
l = Length of Near Field	D^2/4k	4284	meters
L = Beginning of Far Field	0.6D^2/k	10281	meters
G = Antenna Gain @ 51.4 GHz	n(PI*D/k)^2	15,936,908	72.0 dBi
a = Area of Feed Mouth	PI*d^2/4	0.0007	meters^2

POWER DENSITY CALCULATIONS

Region	Maximum Power Density in Region		Hazard Assessment (FCC MPE Limit = 5 mW/cm^2)
	Formula	Value (mW/cm^2)	
1 Near Field	4nP/A	0.56	< FCC MPE Limit
2 Far Field	GP/(4(PI)L^2)	0.24	< FCC MPE Limit
3 Transition	<= Nr Fld Region	0.56	< FCC MPE Limit
4 Near Reflector Surface	4P/A	1.02	< FCC MPE Limit
5 Between Reflector & Ground	P/A	0.25	< FCC MPE Limit
6 Between Subreflector and Feed	4P/a	121116.7	> FCC MPE Limit (See Attachment)